Manitoba
Agriculture

Field Pea Production in Manitoba

87-03675/

INTRODUCTION

Manitoba is the leading producer of field peas in Canada, supplying an estimated 65 per cent of the country's total production. Since 1977 the acreage has risen from 22,000 ha (55,000 acres) to more than 60,000 ha (150,000 acres) in 1986. Field peas have frequently provided higher net returns than traditional crops in their area of adaptation.

Peas are high in protein (from 16 to 24 per cent) which makes them valuable for both human consumption and livestock feeding. They are used domestically in Canada as dry split peas and in the manufacture of soup. Protein isolate, pea fibre and purified starch are also manufactured in dry pea processing. In addition to domestic consumption, large quantities of Manitoba peas have been exported annually to many foreign countries.

Field peas have become an attractive alternate crop for Manitoba farmers. Yields exceeding 3360 kg/ha (50 bu/ac) have been obtained in commercial production. The average yield for the past 10 years is 1819 kg/ha (27 bu/ac), with a range from 1415 kg/ha (21 bu/ac) in the drought year of 1980, to 2425 kg/ha (36 bu/ac) in 1985.

The crop can be handled with conventional seeding and harvesting equipment, although the addition of a floating cutterbar, lifter guards and pickup reel are highly recommended for the harvest operation.

ADAPTATION

Field peas are a cool season crop well adapted for production in Manitoba. Since the crop is similar to wheat in days to maturity, it can be grown successfully in most areas of the province. Seedling resistance to spring frost makes early seeding possible and desirable. Although spring frost may kill the main shoot, regrowth is usually initiated from axillary buds located below the soil surface. Hot weather during flowering will reduce the seed set.

Field peas are best adapted to well drained, clay loam soils. High yields have also been obtained on heavier clay soils with good surface drainage, and lighter sandy soils with adequate rainfall.

Poorly drained soils should be avoided for pea production, as excessive soil moisture minimizes nitrogen fixation, favoring the development of root rots and other seedling diseases. Stony land is not suitable for field pea production, as stones make harvesting very difficult. If only small stones are present, a roller or packer may be used after planting to attain a level soil surface. Saline soils should be avoided, as field peas have low tolerance to soil salinity.

VARIETIES

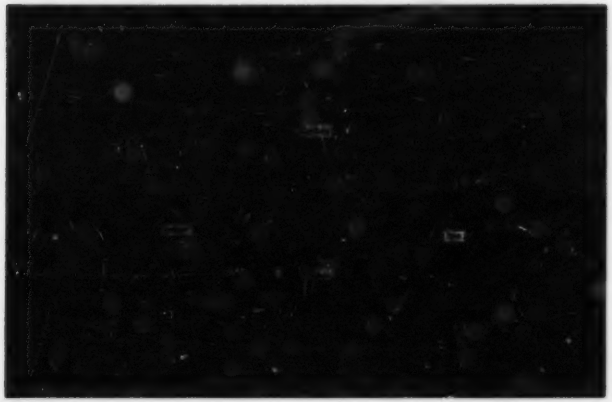
Yellow seeded peas are the most popular type in Manitoba and command the greatest market share of domestic and export markets.

Century, Trapper, Tara and Victoria are the recommended yellow seeded varieties in commercial production in Manitoba.

Century is the largest seeded and has been the major variety in Manitoba for many years. It has found excellent acceptance in both domestic and export markets. Trapper is smaller seeded and is mostly used for livestock feeding. It is attractive for on-farm feeding since seed rates and seeding costs are lower.

The square shape of Tara seed has prevented the variety from gaining market acceptance. Only limited acreages of this high yielding variety are produced in Manitoba. Victoria is a new medium sized, yellow seeded variety from Europe, with earlier maturity and a higher yield than Century.

An interesting new yellow seeded pea which is expected to be available for commercial production in 1988, is the semi-leafless variety Tipu. Developed at the Morden Research Station, this variety has the advantages of



superior standing ability, more uniform seed maturity and a shorter dry-down period. The variety is also well suited to direct combining.

Triumph is the only green seeded variety recommended in Manitoba and has a yield advantage over Century of about 5 per cent. However, it is susceptible to weathering and bleaching at harvest time, leading to inconsistent quality and reduced market acceptability. Chemical desiccants speed dry-down, permitting earlier harvest and minimizing loss of green colour.

SEED TREATMENT AND INOCULATION

The use of pedigreed seed, with guaranteed germination and purity, and which has been tested for seed-borne Ascochyta, is strongly recommended. Additional protection against seed and root rot is obtained from the application of seed treatments containing Captan or Thiram. Caution should be exercised with the use of Captan formulations containing 30 per cent Captan or more. Research indicates that nodulation and nitrogen fixation are reduced by such levels of Captan. Formulations of 15 per cent Captan are preferable and should not be detrimental to nodulation.

Some insurance against loss of inoculum viability may be gained by increasing the amount of inoculum above the recommended rate or by using a granular inoculum. Granular inoculum is applied to the soil rather than the seed, and is more expensive but usually very effective. Granual inoculum may be available only by special order through local dealers.

To obtain maximum effectiveness from the Rhizobium bacteria contained in inoculum, instructions for inoculation should be followed carefully. The key points in successful inoculation are:

1) apply inoculum to the seed with the correct amount of liquid just prior to planting — protect from direct sunlight which quickly kills the rhizobia
2) use a commercial sticker or substitute such as milk powder (*not* calf substitute containing antibiotics which will kill the rhizobia) to obtain maximum adherence of the inoculum to the seed
3) work with relatively small batches of inoculated seed to prevent drying out and loss of viability of the inoculum
4) use more than the recommended rate of inoculum if a seed treatment has been used.

Note: Although correct inoculation of pea seed takes extra time, it is worth the effort to insure good nodulation and the considerable savings gained when peas fix their own nitrogen. (For more detailed information on inoculation of legume seeds, see the Manitoba Agriculture Fact Sheet 'Legume Inoculation').

PLACE IN THE ROTATION

Field peas are not aggressive competitors with weeds so they should be grown on relatively clean land. Summerfallow provides a clean field, but the extra nitrogen supply is wasted on a crop which can fix its own nitrogen.

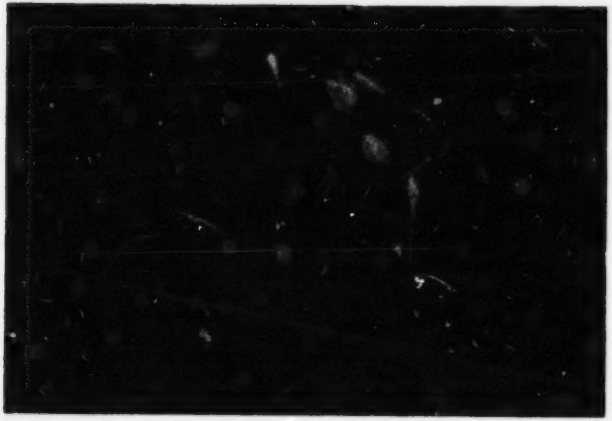
Peas are capable of fixing up to 70 per cent of their nitrogen requirement. This represents not only a considerable saving in nitrogen fertilizer but also a contribution to soil nitrogen. The quantity of nitrogen available to succeeding crops will vary with the environment and the productivity of the pea crop. However, after a crop of peas has been harvested for seed, 25 kg/ha (22 lb/ac) of nitrogen may be available from pea residue.

Peas fit into the rotation best following a cereal crop, when available soil nitrogen is usually depleted. They should not be grown in the same field more frequently than one year in four to prevent the build-up of soil borne diseases. In addition to peas, other crops susceptible to sclerotinia white mold should be avoided in the four year rotation. These crops include lentils, field beans, soybeans, mustard, canola, rapeseed, sunflowers, and safflower.

SEEDBED PREPARATION AND PLANTING

Begin seedbed preparation with a shallow cultivation in early spring. This will help to warm up the soil and promote even and rapid germination of the seed.

Early planting of field peas gives the best opportunity to obtain the highest yields. A seeding rate of 170 kg/ha (2.5 bu/acre) is recommended for the large seeded varieties Century and Triumph, 150 kg/ha (2.25 bu/acre) for the medium seeded variety Tara, and 130 kg/ha (2 bu/acre) for the smaller seeded variety Trapper. Place the seed at a depth of 5 to 8 cm (2 to 3 inches). A regular grain drill or discer seeder can be used for planting. Careful adjustment of the seeding mechanism is necessary to avoid seed damage, particularly with the larger seeded varieties.



Field peas are poor competitors with weeds. Efficient weed control is essential.

FERTILIZER

A soil test is preferable for identifying specific recommendations for nutrients. If soil test results are not available, an application of 30 to 45 kg/ha (27 to 40 lb/acre) of phosphate (P_2O_5) applied by sideband is recommended in all soil types. If applied with the seed the maximum rate of P_2O_5 recommended is 20 kg/ha (18 lb/acre). An application of 35 to 70 kg/ha (31 to 62 lb/acre) of potash (K_2O) is recommended in sands and sandy loam soils. The potash should be placed away from the seed. In addition, 20 kg/ha (18 lb/acre) of sulphur (S) is recommended on well-drained sandy soils and grey luvisol (grey wooded) soils.

WEED CONTROL

Field peas do not compete successfully with weeds. Efficient weed control is therefore essential for maximum pea production.

A broad range of herbicides is currently recommended. Growers should identify their particular weed problem and choose herbicides accordingly. The following herbicides are currently recommended.

Preplant Incorporated

Liquid formulations of soil incorporated herbicides such as Avadex BW and Treflan EC are registered for fall application on peas. However, the use of these liquids is *not recommended* in the fall because incorporation leaves the soil vulnerable to erosion. Granular fomulations are better suited to fall applications.

- Avadex BW — for control of wild oats.
- Rival, Treflan, Triflurex — for control of barnyard grass, green foxtail, yellow foxtail, and broadleaf weeds including chickweed, cow cockle, prostrate knotweed, lamb's quarters, red root pigweed, purslane, Russian thistle; and suppression of wild oats and wild buckwheat.

Postemergence

- Basagran — for control of field bindweed, chickweed, cocklebur, corn spurry, hairy galinsoga, lamb's quarters, wild mustard, red root pigweed, purslane, common ragweed, giant ragweed, Russian thistle, shepherd's purse, stinkweed, annual smartweed species and lady's thumb. (Do not use on leafless or semi-leafless varieties of peas).

- Basfapon, Dalapon, Dowpon, Dowpon M — for control of green foxtail and yellow foxtail.
- Hoegrass 284 — for control of barnyard grass, green foxtail, yellow foxtail, and wild oats.
- Lexone/Sencor — for control of lamb's quarters, wild mustard, red root pigweed, Russian thistle, smartweed, and spring seedlings of stinkweed. Crop tolerance to treatment with this chemical is variable depending on environmental conditions. The 'Guide to Chemical Weed Control', published by Manitoba Agriculture, gives instructions on the precautions necessary in reducing the potential for crop injury.
- MCPA Sodium Salt — for control of burdock, cocklebur, flixweed, lamb's quarters, prickly lettuce, bail mustard, hare's ear mustard, tumble mustard, wild mustard, wormseed mustard, Russian pigweed, wild radish, common ragweed, false ragweed, giant ragweed, shepherd's purse, thyme-leaved spurge, and stinkweed.
- Poast — for control of annual grasses including green and yellow foxtail, wild oats and volunteer cereals. At high rates, Poast will give six to eight weeks suppression of quackgrass. To maximize quackgrass control, rhizomes should be thoroughly fragmented with tillage prior to seeding and spraying. Consult the 'Guide to Chemical Weed Control' for detailed application instructions.
- **TCA (Bar-fox, NaTA TCA, TCA solution) — for control of green foxtail and yellow foxtail.**
- Tropotox Plus — for control of flixweed, hemp nettle, lamb's quarters, ball mustard, wild mustard, wormseed mustard, red root pigweed, wild radish, common ragweed, false ragweed, giant ragweed, shepherd's purse, annual sow thistle, stinkweed, and top growth control of perennial sow thistle, Canada thistle, and field bindweed.

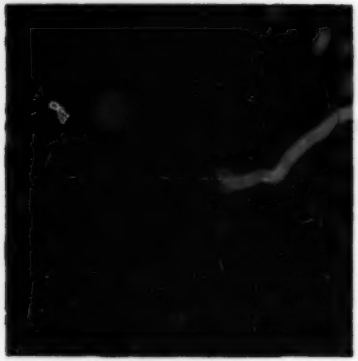
For detailed information on herbicide applications for field peas, consult the 'Guide to Chemical Weed Control' published annually by Manitoba Agriculture.

Young weed seedlings which have started to grow before the pea plants emerge can be culturally controlled by use of the diamond or coil harrow. Avoid harrowing during and immediately following emergence of the pea plants.

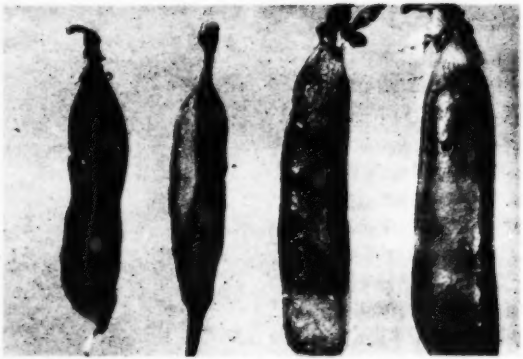
If chemical weed control has failed or is not available, harrowing at the four to six leaf stage may be considered. Choose a hot, dry day for harrowing as this results in destruction of the largest number of weeds while causing the least amount of damage to the pea plants. Harrowing in damp weather or in the presence of dew should be avoided to prevent the spread of disease.

DISEASE CONTROL

The main diseases affecting field peas in Manitoba are Ascochyta blight, bacterial blight, and root rots. These diseases may be present in the soil or seed-borne. Sclerotinia white mold and powdery mildew are of lesser importance, but have appeared sporadically in field peas under high moisture growing conditions. To minimize losses caused by these diseases, growers should adopt the following control practices:



A. Ascochyta blight infections on pods.



B. Pod symptoms of bacterial blight infection.

C. Nodule formation on roots of field peas.

- Seed early
- Use high quality, disease-free seed that has been treated with a fungicide
- Sow peas in the same field only once every four years and avoid other crops susceptible to the same diseases in the rotation
- Locate new plantings as far away as possible from the previous year's pea field.

The following guide will assist in disease identification.

- Ascochyta Blight — This disease is characterized by brown spots on the leaves, stems and pods. Seed-borne infection is probably the principal source. The use of high quality, disease-free seed and seed treatment are important preventative measures. Following harvest, control volunteer growth of pea seedlings at an early date.
- Bacterial Blight — Signs of this disease are water-soaked spots on the leaves, stems and pods, which later turn olive-brown. This disease may be seed-borne and can overwinter on crop debris. For control, follow the outlined control practices.
- Root Rots — Root rot may occur on all underground parts of the pea plant and even on the stem above the soil surface. Young seedlings which are affected usually die. Excessive soil moisture favors the development of this disease. It is therefore important to select well-drained fields for pea production. Peas should be grown in the same field only once in four years, and not following flax, sugar beets, or other legumes in the rotation.

- Sclerotinia Stem Rot (White Mold) — The symptoms of stem rot are premature ripening of the plants. The stems become softened showing the presence of a white cottony growth. Stem rot can occasionally cause severe damage in field peas. Wet weather in June and July promotes development of this disease.

  Small, hard, black fungal bodies (sclerotia) form on the stem surface within the white mold growth and within the stem. As well as avoiding planting peas in the same field more frequently than once in four years, avoid other susceptible crops such as field beans, lentils, canola (rapeseed), mustard, sunflowers, and soybeans in the rotation. Avoid an excessive seeding rate which leads to a dense stand that is conducive to the development of this disease.

- Powdery Mildew — Powdery mildew first appears as minute flecks on the leaves and may later develop into large spreading patches of white powdery growth or mildew. Affected plant parts may become purplish or bluish green and later turn brown. Powdery mildew is most severe in late maturing fields. Locate new plantings away from the previous year's pea fields and seed early to avoid infection. The symptoms of this disease are often very conspicuous but normally it does not result in a serious loss except in later maturing pea crops.

- Other Diseases — Pea diseases of lesser importance are anthracnose, rust, and several virus diseases. To date, these diseases have not caused serious economic losses in field pea production in Manitoba.

INSECT CONTROL

The pea aphid can seriously damage field peas. Heavy infestations of aphids cause stunting of pea plants, and consequently reduce yield and quality. Aphids propagate quickly in hot weather, and high infestations may cause yellow patches in the field. Watch pea crops closely and spray as soon as a marked increase in aphid populations is noted. For recommended control measures, growers should refer to 'Manitoba Insect Control Guide' published annually by Manitoba Agriculture.

Straight combining of field peas is recommended. Desiccation may be necessary if weed growth is excessive.

HARVESTING

The preferred method of harvesting field peas is to straight combine the crop after it has reached full maturity. Unlike other pulse crops, such as fababeans or lentils, peas will not shatter readily if left standing. In fields which contain excessive immature weeds, the use of a desiccant will speed drying and aid in harvesting.

Straight combining results in the lowest losses at the cutterbar because peas released from cut pods are mainly carried onto the combine header and into the machine. In using a windrower, these peas usually end up on the ground and are lost. Straight combining also eliminates the risk of windrow damage by high winds.

Many growers still prefer to windrow their pea crops, since conversion of the combine for just one crop may be too time consuming. If the windrowing method is used, the combine should follow immediately. If this is not possible, the windrow may be packed with a light roller.

Since peas grow quite low to the ground, it is essential to maintain a low cutting height to reduce losses. This makes it imperative that fields be well levelled and free of surface stones. Several devices are available to ease harvesting and reduce losses, such as the automatic header height controls available from some manufacturers. These controls free the operator from continually adjusting the height by manual means, allowing maintenance of a relatively low cutting height.

The floating cutterbar was originally developed for straight combining soybeans. Its success in reducing soybean losses is well documented. The attachment consists of a flexible, independent cutterbar which is mounted ahead of, and lower than, the conventional cutterbar. Several leaf springs and large skid pads support the cutterbar, allowing it to flex and closely follow the ground contour. Several of these attachments are now in use in Manitoba for combining peas. They are used in conjunction with lifter guards and pickup reels, and appear to do a very satisfactory job. If combined with the use of automatic header height control, losses can be reduced with a minimum of operator attention.

Lifter guards are a must for peas. There are many different types in use, including home-built designs. Most of these work satisfactorily when mounted on standard windrowers or combine headers. With floating cutterbars, lifters which extend straight out from the guard are preferable as they allow the cutterbar to achieve a low cutting height.

Pickup reels are extremely useful. They help to lift the vines onto the table, and provide a smooth, uniform flow of crop. Several types are available on the market, and can easily be installed on combines or windrowers.

Peas must be threshed with low cylinder speeds to prevent cracking. Speeds in the range of 300 to 600 rpm are normally used, depending on cylinder diameter and moisture content of the crop. An initial concave setting of 16 mm (5/8 in.) clearance in front and 10 mm (3/8 in.) in the rear may be used. If the vines are green, cylinder wrapping may be a problem. If this occurs, the rear beater or stripper bar may require adjusting.

Return tailings should be kept to an absolute minimum. An initial chaffer setting of 16 mm (5/8 in.) and a lower sieve setting of 10 mm (3/8 in.) may be used. An 11 mm (7/16 in.) round-holed sieve may provide a cleaner product than an adjustable sieve. A high airflow is required for good separation.

In order to minimize seed splitting and cracking, elevator chains should not be allowed to run too loosely. In addition, combine unloading augers and grain loaders should be operated at slow speeds.

Harvesting peas at 18 to 20 per cent moisture content, which is slightly higher than dry, can result in an earlier harvest, less mechanical damage to the peas, and lower shatter losses.

Storage and Drying

Field peas should have a moisture content of 16 per cent or less for safe storage. Clean harvested peas to remove green weed seeds, excessive amounts of immature high moisture seeds, or high moisture foreign material, as soon as possible to prevent spoilage.

If mechanical drying is necessary, a maximum air temperature of 45° C (100° F) should be used for peas intended for seed purposes, and 71° C (160° F) for peas harvested for commercial use.

Natural air drying is an excellent method of drying peas. Advantages of natural air drying include the elimination of high temperature stress cracks and the need for a heated air dryer which requires considerable labour and supervision. For further information on drying, see the Manitoba Agriculture publication 'Grain Aeration and Unheated Air Drying'.

POSITIVE SOIL MANAGEMENT

Soil management practices which help reduce erosion on pea, lentil, field bean and soybean land are as follows:

1. Field Shelterbelts
   On sandy soils field shelterbelts are recommended as the major conservation practice. The distance between belts should be 660 feet and the spacing between trees in the belt, six to eight feet.
2. Tillage
   Fall tillage is not recommended following harvest due to limited residue. What residue there is should be distributed by a straw spreader attached to the harvesting equipment.
3. Cover Crops
   These are small grains that are seeded on harvested pea, lentil and soybean land to control erosion. In cases where fall rye is to be harvested the following year, recommended seeding dates are August 25 to September 15. The seeding dates for other small grains to be used as a cover crop are from immediately after harvest to October 1.

MARKETING

Peas are one of the best established of the special crops in Manitoba. Returns from peas are generally higher than from traditional crops so that many producers are willing to assume most or all of the price risk. This has meant that the larger proportion of the pea crop is not priced out in the spring.

A number of contracting companies offer contracts with part of the crop priced in the spring. The attraction of such a strategy is that a return on a portion of the crop is known and provides some protection from possible lower prices when the crop is delivered. Forward pricing, along with a contract guaranteeing delivery of the crop, may be a sound approach for a first-time pea grower unfamiliar with marketing peas.

As with all special crops, the major attraction of peas in relation to marketing is the freedom from quota restrictions and the opportunity to provide cash flow.